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# THE ENGINEER AND HIS CAMERA

By Prof. F. W. DAVIS, Photography Department

**M**ANY years ago a small group of workers experimenting with light sensitive silver salts laid the foundation for our present methods of photography. The camera of today however is far removed from the antiquated devices bearing the same name 40 years ago. The date of the origin of photography is rather obscure, but Daguerre in 1839 gave the world the Daguerreotype process, considered the first workable method of photography.

In the 100 years following that period the development has been extremely rapid. Until the year 1871 photographic plates had to be dipped in solutions and used wet while being exposed. At this time it was discovered how to make the emulsions sufficiently sensitive so that it

could be used in a dry form on glass. This was substantially the same type of photographic plate as is now in use.

There are three general classes of people interested in photography: the commercial photographer who makes his living by the practice of the science; the scientist or teacher who uses photography as one of his major tools in the attack and solution of scientific problems; and the amateur who is interested because it brings him enjoyment and relaxation. From the standpoint of a hobby it ranks with the most popular having retained its fascination for many years. As an aid in the practice of engineering it is invaluable due to its critical and unbiased eye. Many of our engineering graduates in the past who possessed a

knowledge of photography have used it to a great advantage in their work.

A knowledge of photography will also assist the engineer in his field of blue print production. He will be associated with blue prints possibly every day but little thought is ever given to improving their quality. Ripe dividends are often in store for the engineer who can diagnose blue print troubles and give his employer legible blue and white prints instead of some of the washed out effects that we have all seen from time to time.

The most common questions asked by beginners are "Which camera shall I buy?" and "How can I learn to operate it?" One may acquire a knowledge of photography including camera operation from any or all of the following sources:—by reading books and current literature on the subject, taking courses in colleges and universities, studying good pictures and by taking many pictures and carrying out the processes of development and printing.

Unfortunately the answer to the question "Which camera shall I buy?" is not so easy. It is similar to "Which automobile shall I buy?" One might say that it depends on the money available, the use to which the equipment will be put, and personal preference. Obviously a much different type of camera must be used to photograph a stationary piece of equipment or a bullet in flight with an exposure of one one-millionth part of a second. A general statement might be made that the essential difference between a medium priced camera (\$15-\$25) and an expensive one (\$100-\$200) is the versatility and adaptability of the more elaborate model or its ability to produce pictures under adverse conditions.

The miniature camera has become a very popular type in the last few years due to its compact size, portability and high speed well corrected lens. An engineer, after working with other types of cameras will readily appreciate the skill of workmanship and mechanical perfection in these small pieces of equipment. Many engineers prefer this camera because of these features, carrying it in their pocket where it is readily accessible upon a moment's notice for a picture under almost any physical condition. The small negatives (3-4 in. x 1 in.) are then enlarged, or lantern slides made from them. The engineer will undoubtedly be called upon many times to deliver a lecture before various groups and technical societies on some phase of his work. The ability to make clear, concise lantern slides illustrating various technical points (which would otherwise be extremely difficult to explain) will be appreciated many times.

Just one warning note however, about these small cameras. They will do a lot of things but not everything as there are times when nothing will replace the old style view camera which may be obtained in any size from the larger 11x4 down to 2 1-4x3 1-4 in. These small view cameras or commercial cameras are very popular and give excellent results and at the same time are much cheaper than the miniature camera.

The graflex cameras, those used by the news photog-

raphers for recording speed events are also available for the amateur in the smaller sizes and many prefer this type of camera.

Motion pictures were formerly thought too expensive to warrant the consideration of the average person. Such is not the case today with the advent of the 16 mm. and 8 mm. equipment. Too much cannot be said concerning the merits of this process for recording physical phenomena. The slow motion camera instead of making pictures at the conventional rate of 16 per second will make them at the enormous rate of 50,000 per second, which when projected gives an excellent device for analyzing high speed phenomena.

Dr. Edgerton at the Massachusetts Institute of Technology has such a camera with which he has made records of birds in flight, a hammer breaking a light bulb, drops of water falling into a vessel of water and many others.

The 16 mm. and 8 mm. cameras are small enough to be extremely portable. An example of the use of a 16 mm. camera here at the Ohio State University for scientific recording will be briefly described. The College of Veterinary Medicine wishing to record what happened in a cow's stomach while digesting food decided to try motion pictures. In order to proceed it was necessary to cut a hole, which was plugged with a rubber stopper, in the side of a living steer. This stopper could be removed at will for observation, apparently not bothering the animal in the least. The next problem was to make motion pictures.

The opening was made large enough to allow a camera to enter, but the big problem was lighting. It was necessary to run wires into the stomach and suspend a photoflood bulb (equivalent of 500 watts). After quite some experimenting 500 feet of film were made in natural color.

As a concluding remark I might state that whether an engineer uses his camera for purely technical purposes or merely as hobby, he should by all means do his own developing and printing (motion pictures excepted) as here is where the real thrill comes in. Also here is the place where a negative requiring many days to produce may be ruined in a few minutes. Only by becoming efficient at this very important phase of photography can one insure satisfactory results.

After 5,000 years, fishermen still use the net for catching fish, and a spider was the cause of it all. At that time, a Chinese was watching the intricate movements of a spider as it wove its web. The completed web gave him the necessary initiative to construct a fish net.

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Did you know that at one time the world stood still for ten days? If you are not able to recall the incident, don't become alarmed, as it happened in 1582. In order to adjust the calendar to astronomical calculations, Pope Gregory decreed that the day after October 4 should be October 15.